EUROPEAN PATENT APPLICATION

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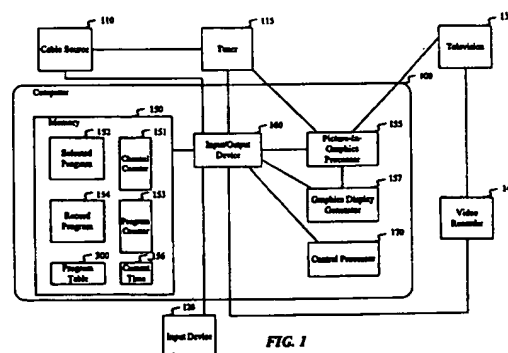Woodinville,
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(54) Method and system for providing efficient selection of television programs.

(57) A computer method and system for providing a user with efficient selection of a television program to view or record. The method provides concurrent display of a television schedule with a graphic description and a textual description of the television program currently selected by the user from the displayed television schedule. The displayed television schedule comprises a schedule layout displayed to the user on a screen display. The schedule layout includes a number of program names arranged in an adaptively learned order based on the frequency of the user's previous selections. Each time a program name is selected by the user, the graphic description and the textual description of the television program represented by the selected program name are displayed concurrently with the adaptively ordered schedule layout. Thus, the user can select a television program perceptively and without delay.

FIG. 1

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the user can rapidly select and view the descriptions of a number of television programs when making a decision.

In a preferred embodiment of the invention, a computer obtains the program name and the description of each of a number of television programs from a cable source which broadcasts the television program over cable. The computer also obtains from the cable source a time of broadcast of each television program and a channel indicator indicating the channel over which each television program is to be broadcast. The computer stores the program name, a channel indicator, including a channel name and a channel number, a time of broadcast, including a day, start time, and end time of the broadcast, and a description of each television program, in an entry in a program table provided for that television program. Upon a request by the user, the computer displays the program name, channel indicator and time of broadcast in the schedule layout in a fashion which visually associates the program name with the channel indicator and time of broadcast. Preferably, the schedule layout includes a grid containing one of the program names in each entry. The grid has a channel axis for referencing the channel indicators and a time axis for referencing the corresponding times of each of the scheduled television programs. The order of entries along the channel axis is based on the frequency of user selections of each of the channels.

The computer provides the description of each currently selected program to the television for concurrent display with the schedule layout. The description provided for each television program includes a text string stored by the computer which describes the television program. The computer provides the text string describing a television program to the television for display when the program name of the television program is designated in the grid by the user via an input device such as a remote control. The description provided for each television program also includes a picture-in-graphics display window. A picture-in-graphics display window is similar to a picture-in-picture display window except that the reduced-size picture is displayed in a display window superimposed on a computer graphics background. If the program is currently being broadcast, the computer provides to the television to display in the picture-in-graphics display window the program currently being broadcast. Otherwise, the computer controls the television to display a blank window, or, in an alternative embodiment, a bitmap for the network or television program indicated by the bitmap indicator. The bitmap is provided by the cable source. When a program has been selected for viewing as described above, the selected program

is displayed in full screen in place of the schedule layout. Thereafter, when the user changes channels, the program name, channel indicator and text string are displayed superimposed on the program displayed in a corner of the screen.

The computer system of the preferred embodiment also includes a video recorder. The computer controls the video recorder to record a television program when it is broadcast if the television program has been previously selected by the user to be recorded. In the preferred embodiment, the computer can control the video recorder to record the television program even when the television is not "ON." The user selects a program to be recorded by selecting the program name of the program from the schedule layout. When the time of broadcast of the selected television program is reached, the computer briefly displays the text string describing the selected program and then controls the video recorder to record the selected program.

In the preferred embodiment, the user can also select a television program to view or record with reference to a specific topic which defines the nature of the television program. The computer provides to the television for display a list of topics. Each topic corresponds to a set of the scheduled television programs fitting the category described by the topic, such as movies, sports, and so forth. The topic list is displayed in an adaptively learned order based on the number of television programs previously selected from each topic. For example, if movies have been selected most frequently, then a "movies" topic is displayed first in the topic list.

The user then designates a topic from the topic list via the input device. When the topic is designated, the computer provides to the television for display a program list which lists the program names of the television programs defined by the selected topic. The user selects a television program to view or record by designating a program name in the displayed program list via the input device. The computer updates and stores the number of television programs selected for each topic. When the topic list is thereafter displayed, the topics are displayed in an order based on the updated number of television programs selected for each topic.

Brief Description of the Drawings

Figure 1 is a block diagram of the computer system of the preferred embodiment of the invention.

Figure 2 is an illustration of the screen display displayed in accordance with the preferred embodiment.

graphic portions. The picture-in-graphics processor 155 sends the composite image to the television 130 to be displayed. When the user requests to record the selected program, the selection program 152 designates the program to be recorded. A record program 154 stored in the memory 150 is executed by the CPU 170 concurrently with the selection program. The record program provides a command to the video recorder 140 via the I/O device 160 to record the designated program at the time or broadcast of the selected program. In the preferred embodiment, the command is an infrared command.

A screen display is shown in Figure 2 which is displayed by the television 130 under control of the selection program 152 when the user requests a schedule. The screen display includes a schedule layout 200 which displays the program name, channel indicator, and time of broadcast of each of the television programs. The schedule layout 200 includes a grid 210 in which a grid entry 212 is provided for each of a number of television programs broadcast by the cable source 110. Each grid entry 212 contains the program name of one of the television programs. The grid entries 212 are arranged horizontally according to a time of broadcast and arranged vertically according to the channel over which the television programs are broadcast. In an alternate embodiment, the grid entries 212 may be arranged vertically according to the time of broadcast and horizontally according to the channel. A number of time entries 215 are provided along a horizontal time axis 214 which display the different times over which the television programs are broadcast. Similarly, a number of channel entries 217 are provided along a vertical channel axis 216 which display the different channels over which the television programs are broadcast.

In the embodiment of the invention having the screen display shown in Figure 2, the selection program 152, via the graphics display generator 157, controls the television 130 to display only a portion of the grid 210 at a given time. Thus, the grid 210 can contain a large number of times and channels over which the television programs are broadcast without the need to reduce each grid entry 212 to a size in which the program name becomes unreadable in order to display all television programs at the same time. It will be appreciated by one of ordinary skill in the art that the schedule layout 200 can be designed such that the size of the displayed portion of the grid 210 can be varied.

In an alternative embodiment, the channel entries 217 are arranged along the channel axis 216 according to a frequency with which channel entries associated with the program names have been designated by the user. Each time the user des-

ignates one of the program names, the selection program 152 increments a channel counter 151 for the channel entry 217 associated with the designated program name. The channel counter 151 is preferably stored in the RAM portion of the memory 150. The selection program 152, via the graphics display generator 157, controls the television 130 to arrange the channel entries 217 in an order of use from the channel entry with the highest value in its associated channel counter 151 to the channel entry with the lowest value in its associated channel counter 151. Figure 2 illustrates a state of the schedule layout 200 wherein the order of use for the channel entries 217 is channels 2,4,5, and 7.

In yet another embodiment, the channel entries can be arranged along the channel axis 216 according to a frequency with which program names have been designated by the user. Each time the user designates one of the program names, the selection program 152 increments a program counter 153 associated with the designated program name. The program counter 153 is preferably stored in the RAM portion of the memory 150. The selection program 152, via the graphics display generator 157, then controls the television 130 to arrange the channel entries 217 in an order of use from the channel entry whose program name has been designated the most number of times, to the channel entry whose program name has been designated the least number of times. Figure 2 illustrates a state of the schedule layout 200 wherein the program name designated the most number of times is associated with channel 2, for the currently displayed channel entries. The program name designated the least number of times is associated with channel 7, for the currently displayed channel entries. There may be more frequently displayed program names above channel 2 and less frequently displayed program names below channel 7 since the schedule 200 scrolls (the scroll feature is described in more detail below).

While the discussion above has focused on arranging channel entries 217 based on the frequency with which associated program names have been designated, those of ordinary skill will understand that other attributes or selection patterns can be monitored and the channel entries rearranged based on the results of that monitoring.

The schedule layout 200 also includes a day selector 220 with which the user selects the day for which the television programs are to be displayed by the grid 210. The day selector 220 contains arrow buttons with which the user moves the selected day chronologically forward or backward, as shown. The schedule layout 200 also includes a day entry 222 which indicates the day previously selected by the user via the day selector 220 and

be placed at the end of the video tape to indicate the end of the television program. This makes it easier to find the end of the television program. The selection program 152, via the graphics display generator 157, displays a record icon 260 next to the program name in the grid entry 212 for the selected television program. When the designated program is thereafter broadcast, the record program 154 records the designated program. When the television button 258 is selected, the selection program 152, via the tuner 115 and the picture-in-graphics processor 155, controls the television 130 to display the selected television program.

The present invention stores the program information necessary to provide the screen display to the television 130. The selection program 152 stores in the memory 150 the program information in a program table 300 shown in Figure 3. The program table 300 includes a program entry 310 for each television program represented by one of the grid entries 212 of the screen display. Each program entry 310 includes a name field 320 which contains the program name for each television program. Each program entry 310 also includes the time of broadcast of each program. The stored time of broadcast comprises a day, a start time, and a length of the broadcast. Each program entry 310 further includes a day field 322 which stores an indication of the day of the broadcast, a start time field 324 which contains an indication of the start time of the broadcast, and a length field 326 which contains an indication of the length of the broadcast.

The selection program 152 also stores a channel indicator in the program table 300 in the memory 150. Each program entry 310 includes a channel name field 328 which stores the channel name of the channel over which the corresponding television program is broadcast. Each program entry 310 also includes a channel number field 330 which stores the channel number of the channel over which the corresponding television program is broadcast. For ease of description, the channel name is shown in Figure 3 stored in the program table 300. In an alternate embodiment, however, each channel name is stored in a separate table together with each channel number so that the channel name does not have to be repeated each time a program is provided on a same channel.

The computer system stores a description of each television program. The selection program 152 stores the description in the program table 300 in the memory 150. The description can be stored in a compressed format. Each program entry 310 includes a description field 340 which contains the text string describing the television program, and a bitmap identifier field 350 which contains the bitmap identifier.

Finally, when the user makes a request to record a selected program, the selection program 152 designates the selected television program to be recorded upon reaching the broadcast time of the program. The selection program 152 stores a record indicator for the selected program in the program table 300, indicating that the selected program is to be recorded. Each program entry 310 includes a record indicator field 360 which stores the record indicator. For example, the record indicator is a flag having a value of '1' (indicating "TRUE") if the corresponding program is to be recorded and a value of '0' otherwise (indicating "FALSE"). In an alternative embodiment, a separate table is created with entries only for programs designated to be recorded. Each entry in the separate table contains a pointer to the program entry 310 for the program designated, and a recording flag which indicates whether the program is currently being recorded.

FLOW DIAGRAMS:

A flow diagram of the selection program 152 which provides the user with selection of television programs is shown in Figure 4. As explained above with reference to Figure 1, the selection program 152 is stored in the memory 150 and performed by the CPU 170 of the computer 100. It should be understood that, in interrupt driven systems, the user input-based steps shown in Figure 4 and other flowcharts may not be performed in the exact order shown in Figure 4, but are rather performed at the time of user input as indicated by an appropriate interrupt. Such steps are shown sequentially, however, for ease of explanation. In step 400, the selection program initially obtains the program information from the cable source 110 as described above. In step 402, the selection program stores the obtained program information into the program table 300. In an alternative embodiment, where the speed of the underlying system allows, the program information resides at the cable source 110 and is obtained as needed by the computer 100 in real time. The selection program 152 then continually responds to input from the user via the display menu 250.

In step 403, the selection program initially displays the display menu 250. In step 404, the selection program 152 determines whether the user has selected the schedule button 252 from the display menu 250. If so, the selection program 152 performs a schedule routine in step 406 which displays the schedule layout 200 and obtains user input based on the displayed schedule layout 200. When the schedule routine returns, control of the selection program 152 branches to step 426.

changes the selected program. In step 600, the change selection routine highlights the selected television program and removes any highlighting from a previously selected program. For example, the change selection routine displays the selected grid entry 212 with an increased brightness or in reverse video. Control then proceeds to step 602. In step 602, the change selection routine displays in the text display window 230 of Figure 2 the text string which corresponds to the program name selected.

The computer system also provides a picture-in-graphics display window 240 in the screen display shown in Figure 2. The change selection program displays a graphic image in the picture-in-graphics display window 240 which corresponds to the newly selected program. In step 610, if the newly selected program is currently being broadcast (i.e., it is ON), then the change selection routine performs step 612. In step 612, the change selection routine controls the tuner 115 to display the newly selected program on the television 130 in the picture-in-graphics display window 240. If the change selection routine determines in step 610 that the selected program is not currently being broadcast, then the change selection routine performs step 614. In step 614 the change selection routine displays in the picture-in-graphics display window 240 a bitmap identified by the bitmap identifier 350 of the Program entry 310 for the selected program, if the bitmap exists, or a blank window, if the bitmap does not exist.

When the user selects the topics button 254 from the display menu 250, then a topics routine is performed. A flow diagram of the topics routine is shown in Figure 7. In step 700, the topics routine displays a topics list or a set of topic images (e.g., icons) which contains a number or topics from which the user can select a television program definable within a particular category, such as 'sports', 'movies', and the like. The topics routine displays the topic list on the screen display shown in Figure 2 in place of the schedule layout 200. The topic list is provided by the cable source 110. The topics routine displays the topic list concurrently with the text window 230, picture-in-graphics window 240 and display menu 250. In step 702, the topics routine determines whether the user has selected a topic from the displayed topic list using the input device 120. If the user has not selected a topic, control proceeds to step 703, wherein the topic routine determines whether the user has selected the schedule button 252, record button 256 or the television button 258. If so, the topics routine returns. If not, control loops back to step 702, and the topic routine continues to check for user selections.

If, in step 702, the user does select a topic from the topic list displayed, then control proceeds to step 704. In steps 704 through 714, the topics routine responds to user selection of a television program categorized according to the selected topic. In step 704, the topics routine increments a topic count stored in the memory 150 of the computer 100. The topic count indicates the total number of times that the particular topic selected by the user has been selected in the past. Control then proceeds to step 706 wherein the topics routine updates the order in which the topics are displayed in the topic list in step 700 according to the number or items selected. That is, the most frequently selected topic is displayed first, the second most frequently selected topic is displayed second, and so on. Control then proceeds to step 708. Thus, the next time the topics routine is performed, the updated order of the topics will be reflected. One of ordinary skill in the art will recognize various well-known techniques for maintaining and updating the order in which the topics list is displayed. One or ordinary skill will also recognize that the adaptively learned order or display described above can be applied not only based on the frequency or topics selected, but also based on the frequency or each network, show, actor, director, etc., selected. Also, the adaptively learned ordering described can be applied to the order in which the grid entries 212 are displayed in the schedule layout of Figure 2.

The topics routine displays in step 708 a program list which lists the program names of all of the television programs defined by the topic selected by the user in step 702. If the topics routine determines in step 710 that a program name has been designated by the user from the displayed program list using the input device 120, then control proceeds to step 712 wherein the change selection routine is performed. The change selection routine has been described with reference to Figure 6. Control then loops to repeat step 710. If the topics routine determines in step 710 that a program name has not been designated, then control proceeds to step 714. The topics routine determines in step 714 whether the topics button 254, the record button 256, or the television button 258 has been selected from the display menu 250. If so, the topics routine returns to the selection program 152, which responds to the selection. Otherwise, control loops back to step 710 and the topics routine continues to check for user selection of a program menu from the program list.

The present invention provides a user with the ability to select a television program to be recorded. Figure 8 is a flow diagram of the record program 154 which is stored in the memory 150 of the ·computer 100. The record ·program 154 is

(a) storing, for each of the television programs, a program name, a time of broadcast and a textual description of the television program;

(b) providing to a display device, for each of the television programs, the program name and the time of broadcast for display in a schedule layout which visually associates the program name with the time of broadcast;

(c) obtaining from the user a designation of the selected program; and

(d) providing to the display device the textual description of the selected program and a graphic description or the television program for concurrent display with the schedule layout in a separate location.

2. The method of claim 1 wherein step (a) further comprises storing a channel indicator associated with the program name and the time of broadcast for each of the television programs, and step (b) comprises providing the channel indicator to the display device for display in the schedule layout so as to be visually associated with the channel indicator with the program name and the time of broadcast.

3. The method of claim 2 wherein the schedule layout comprises a grid containing the program name of each of the television programs and having a channel axis which references the channel indicator associated with each of the television programs and a time axis which references the time of broadcast of each associated with the television programs.

4. The method of claim 3, further comprising:

for each channel indicator, determining the number of times that an attribute associated with the channel indicator has been designated by the user; and

arranging the channel indicators on the channel axis in order from the channel indicator with the attribute designated the most number of times to the channel indicator with the attribute designated the least number of times.

5. The method of claim 3, further comprising:

for each channel indicator, determining the number of times that program names associated with the channel indicator have been designated by the user; and

arranging the channel indicators on the channel axis in order from the channel indicator with the highest frequency of program names designated by the user to the channel indicator with the lowest frequency of program names designated by the user.

6. The method of claim 3, further comprising:

for each channel indicator, determining the number of times that a program name displayed on the time axis has been designated by the user; and

arranging the channel indicators on the channel axis in order from the channel indicator with the program name designated the highest number of times to the channel indicator with the program name designated the lowest number of times.

7. The method of claim 1 wherein step (a) comprises storing a set of topics, each topic having one or more programs classified according to the topic, and wherein step (c) comprises obtaining a topic selected by the user, displaying a list of the television programs classified according to the selected topic and obtaining from the user a designated program from the program list as the selected program.

8. The method of claim 7 wherein step (c) further comprises providing the user with a list of topics and obtaining from the user a designated topic from the topic list as the selected topic, the list of topics being provided in an order corresponding to the number of times each of the topics has been previously selected.

9. The method of claim 7 wherein step (c) further comprises displaying the list of television programs classified according to the topic in an order based on program use criteria related to the topic.

10. The method of claim 7 wherein step (c) further comprises displaying the list of television programs classified according to the topic in an order based on the frequency of selection of television programs displayed on a same channel.

11. The method of claim 1, further comprising the steps of (e) obtaining from the user a request to view the selected program, and (f) displaying the requested program on a full screen of the display device.

12. The method of claim 11, further comprising the step or displaying program information superimposed on the display of the requested program when a channel is changed by the user to display the requested program.
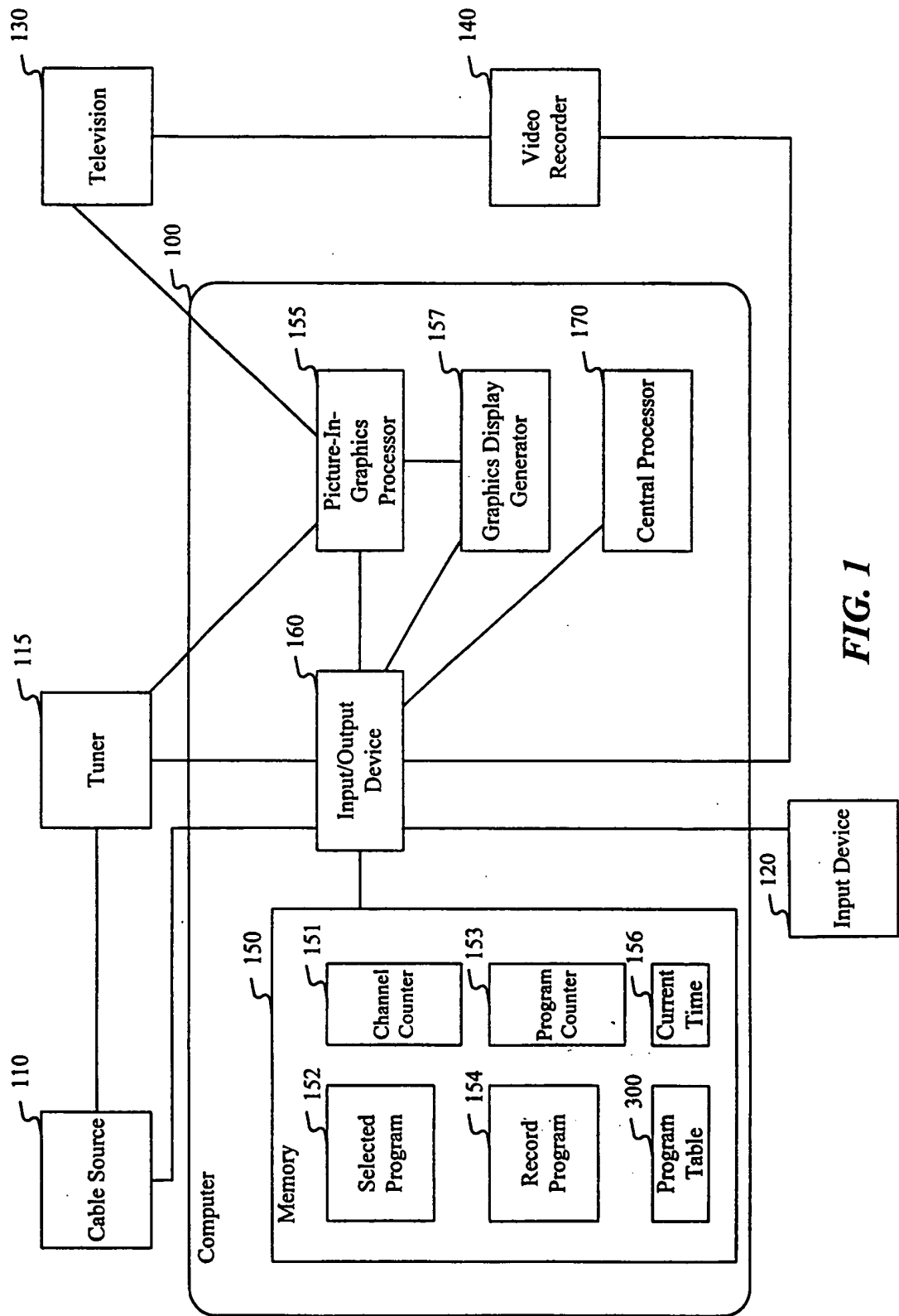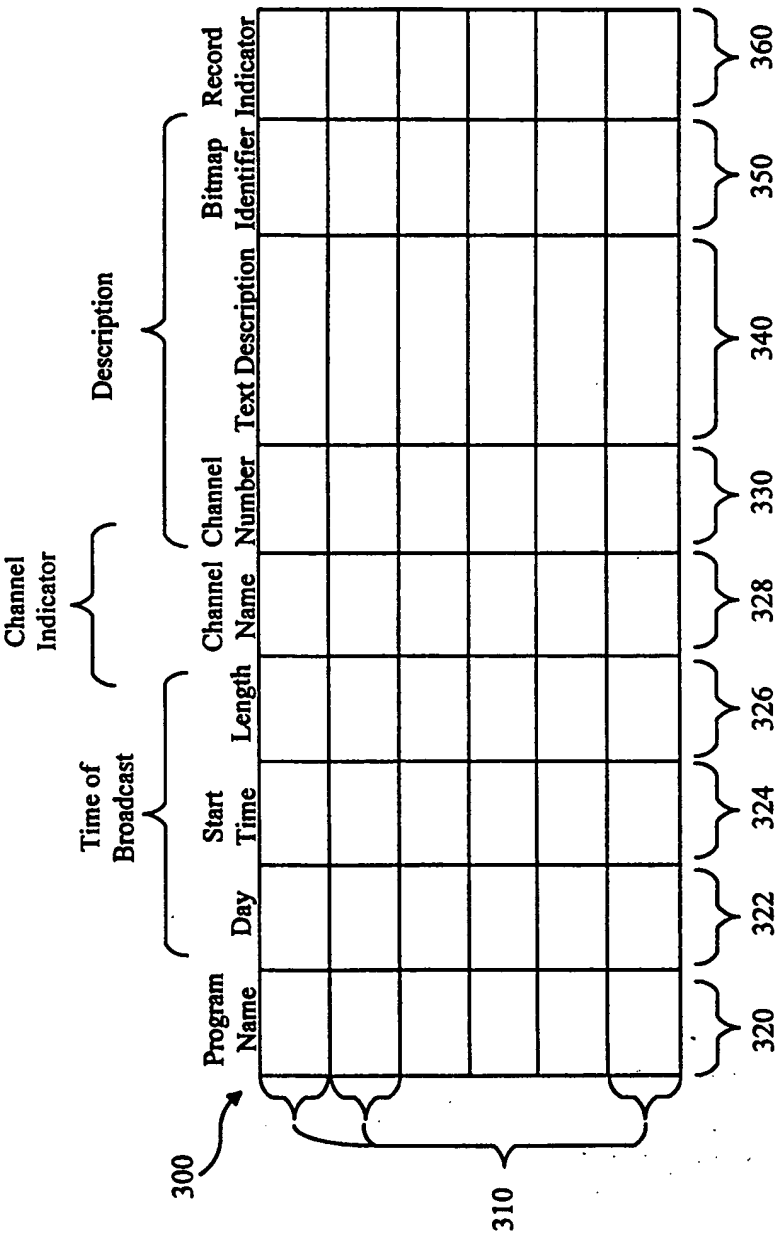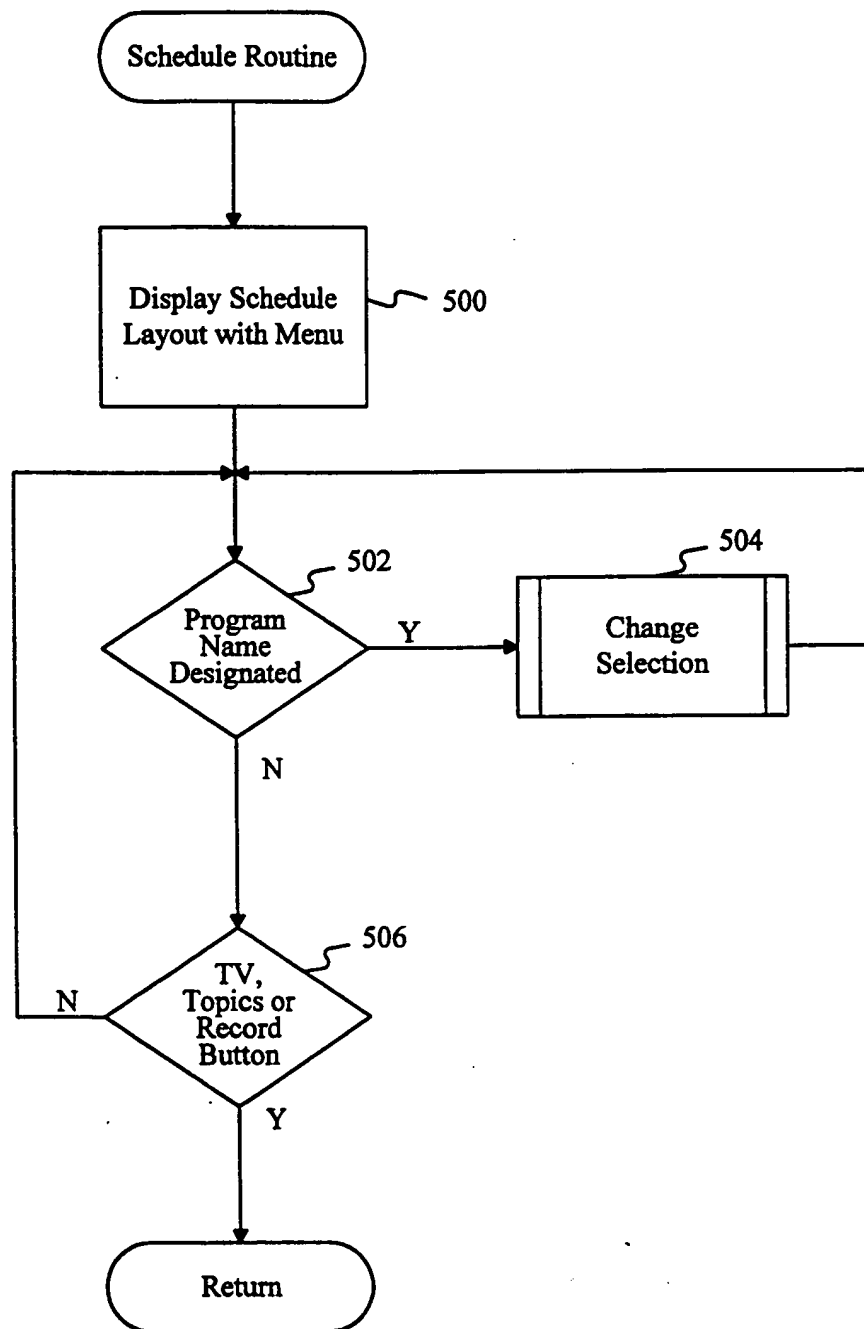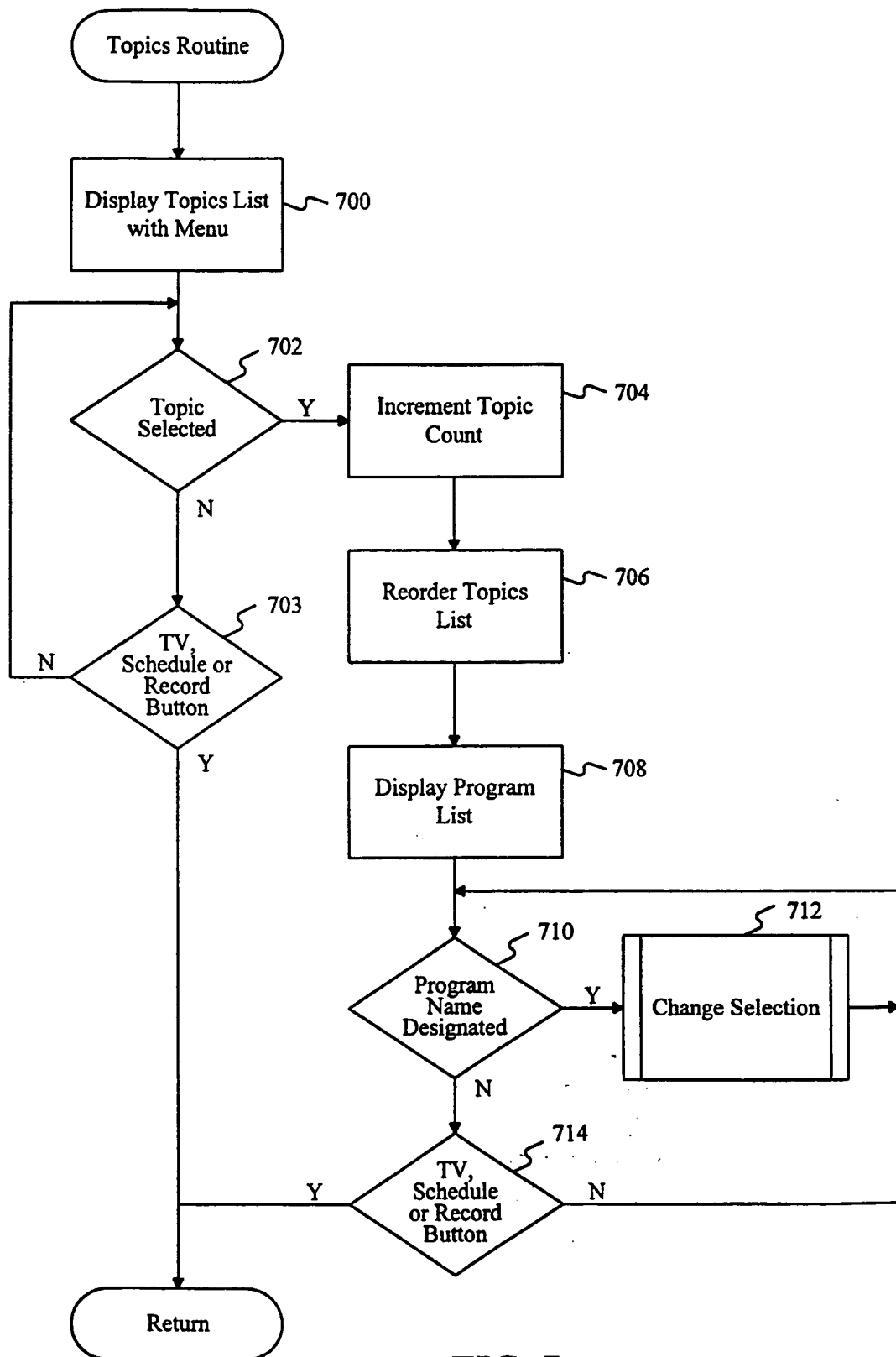
130 — Television

140 — Video Recorder

100

155 — Picture-In-Graphics Processor

157 — Graphics Display Generator

170 — Central Processor

115 — Tuner

160 — Input/Output Device

120 — Input Device

110 — Cable Source

Computer

Memory — 150

151 — Channel Counter

153 — Program Counter

156 — Current Time

152 — Selected Program

154 — Record Program

300 — Program Table

FIG. 1

FIG. 3

Schedule Routine

Display Schedule
Layout with Menu   ~ 500

502

Program
Name   Y   Change
Designated   Selection   ~ 504

N

506

N   TV,
Topics or
Record
Button

Y

Return

FIG. 5

```
        ┌──────────────────┐
        │  Topics Routine  │
        └────────┬─────────┘
                 │
                 ▼
        ┌──────────────────┐
        │ Display Topics List │ ~ 700
        │    with Menu     │
        └────────┬─────────┘
                 │
                 ▼
             ╱╲  702
            ╱  ╲
           ╱Topic╲──Y──► ┌──────────────────┐
           ╲Selected╲     │ Increment Topic │ ~ 704
            ╲  ╱            │     Count       │
             ╲╱            └────────┬─────────┘
              N                     │
              │                     ▼
              ▼            ┌──────────────────┐
             ╱╲  703        │  Reorder Topics │ ~ 706
            ╱  ╲           │      List       │
       N ──╱ TV, ╲         └────────┬─────────┘
           ╲Schedule or╲             │
            ╲Record ╱                ▼
             ╲Button╲       ┌──────────────────┐
              ╲  ╱          │ Display Program │ ~ 708
               ╲╱          │      List       │
                Y          └────────┬─────────┘
                │                    │
                │                    ▼
                │               ╱╲  710          ┌──────────────────┐ 712
                │              ╱  ╲              │                  │
                │             ╱Program╲──Y──►    │ Change Selection │
                │             ╲ Name  ╱          │                  │
                │             ╲Designated╲       └──────────────────┘
                │              ╲  ╱
                │               ╲╱
                │                N
                │                │
                │                ▼
                │           ╱╲  714
                │          ╱  ╲
                │     Y ──╱ TV, ╲── N
                │         ╲Schedule╲
                │          ╲or Record╱
                │           ╲Button ╱
                │            ╲  ╱
                ▼             ╲╱
        ┌──────────────┐
        │    Return    │
        └──────────────┘
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FIG. 7

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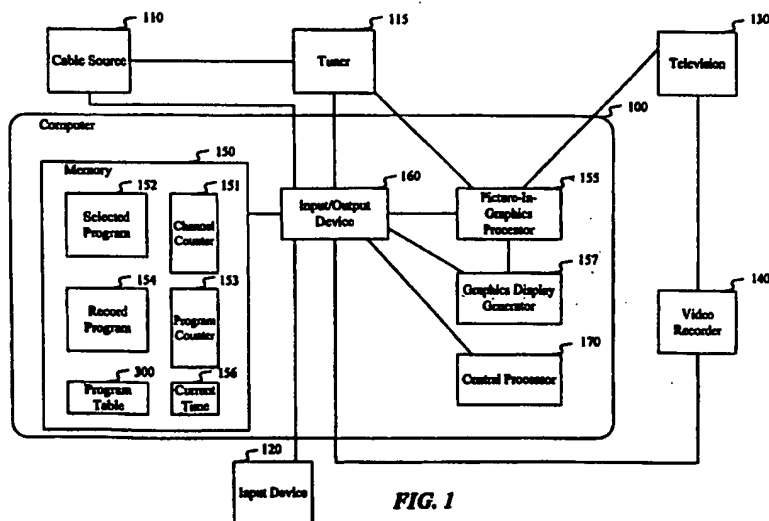Seattle, Washington 98102 (US)
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(54) **Method and system for providing efficient selection of television programs**

(57) A computer method and system for providing a user with efficient selection of a television program to view or record. The method provides concurrent display of a television schedule with a graphic description and a textual description of the television program currently selected by the user from the displayed television schedule. The displayed television schedule comprises a schedule layout displayed to the user on a screen display. The schedule layout includes a number of program names arranged in an adaptively learned order based on the frequency of the user's previous selections. Each time a program name is selected by the user, the graphic description and the textual description of the television program represented by the selected program name are displayed concurrently with the adaptively ordered schedule layout. Thus, the user can select a television program perceptively and without delay.

FIG. 1

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	European Patent Office	EUROPEAN SEARCH REPORT	Application Number
			EP 95 10 7039

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB-A-2 208 142 (HASHIMOTO CORP.) 1 March 1989 * page 1, line 14 - page 2, line 28 * * page 3, line 3 - line 28; figure 1 * ---	1,15,16, 19,21	
A	EP-A-0 488 379 (MATSUSHITA ELECTRIC IND. CO., LTD) 3 June 1992 * column 3, line 23 - column 4, line 16 * * column 7, line 26 - column 9, line 21; figures 1A,3A-3C * ---	1,15-19, 21	
A	EP-A-0 447 968 (RCA) 25 September 1991 * the whole document * -----	1,19	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 January 1996	Fuchs, P